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ABSTRACT

Worker-oriented, job-oriented, and cognitive task analyses have all been used as tools for closing the gap between what curriculum teaches and what workers do. Although they share a commonality of purpose, the focus, cost, and practicality of task analysis techniques vary. Worker-oriented task analysis focuses on general human behaviors required of workers in given jobs. Job-oriented task analysis is a systematic process for collecting information about the highly specific and distinct tasks--the technologies---required for particular jobs. Cognitive task analysis attempts to determine the thought processes workers follow to perform the tasks and identify the knowledge needed to perform the tasks at various levels. Five guidelines for practitioners in deciding which method(s) offer the best options for application are as follows: (1) determine the strategy of task analysis that is most likely to generate the specific information needed for the education/training program; (2) consider the cost efficiency of the strategy selected; (3) be able to ensure that the strategy provides acceptable and reliable information; (4) plan for periodic review and update of any task analysis; and (5) consider using a combination of methods to capitalize on the strengths of each. (Contains 11 references.) (YLB)

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Task Analysis Strategies and Practices
Practice Application Brief

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PRACTICE APPLICATION BRIEF

Task Analysis Strategies and Practices

Worker-oriented, job-oriented, and cognitive task analyses have all been used as tools for closing the gap between what curriculum teaches and what workers do. Although they share a commonality of purpose, the focus, cost, and practicality of task analysis techniques vary. This *Practice Application Brief* presents information on current practices and examples of the various types of task analyses, highlighting their strengths and weaknesses and detailing how they can be used in diverse settings to promote knowledge and skill development.

Task Analysis Models

Initiated for the purpose of helping management make hiring, promotion, wage, and salary decisions, occupational analysis is designed to identify the work requirements of specific jobs by providing a detailed overview of the tasks that must be performed by workers in a given occupational area. Task analysis, the next step in the process of job analysis, is conducted to identify the details of specified tasks, including the required knowledge, skills, attitudes, and personal characteristics required for successful task performance. This information is used to develop education and training programs that are based on the realities of the job.

Current practices focus on three main types of task analysis: (1) worker-oriented task analysis, which focuses on general human behaviors required of workers in given jobs; (2) job-oriented analysis, which focuses on the technologies involved in the job; and (3) cognitive task analysis, which focuses on the cognitive components associated with task performance (Hanser 1995). Although definable in this manner, the distinctions among the types are often blurred in practice. In an attempt to prepare workers who are able to meet the demands of a changing, high-performance workplace, single-focused task analyses are giving way to combinations that reflect the greater breadth and depth of skills required for the jobs of the future. Following is a summary of a literature review of the three task analysis models.

Worker-oriented Task Analysis

The traditional methods of job/task analysis investigate work behaviors and the tasks associated with them. Although the work behaviors can be communicated, their application in performance of a task must be observed. Thus the process of worker-oriented task analysis typically involves discussions with job incumbents, observations of job tasks performed by workers, interviews with workers, review of tasks by management/supervisors, and surveys to determine the criticality of tasks and the knowledge and skill requirements (Clifford 1994).

Job-oriented Task Analysis

Considered a traditional method, job-oriented task analysis is a systematic process for collecting information about the highly specific and distinct tasks required for particular jobs. The job-related task analysis relies on employees and supervisors who can explicitly state the step-by-step sequence of job tasks and an auditor who can describe the behaviors in a way that is understandable to employees and supervisors (Texas Higher Education Coordinating Board 1995).

Cognitive Task Analysis

Cognitive task analysis attempts to determine the thought processes workers follow to perform the tasks and identify the knowledge needed to perform the tasks at various levels, e.g., novice and expert (Hanser 1995). It is a process used to gather information on worker behavior in problem-solving situations that highlights the interactive and constructive nature of everyday knowledge and the social constraints that influence problem solving (Llorente 1996). Cognitive task analysis relies on the techniques of observation and interview.

Strategies and Resources for Practice

Given the varied nature of task analysis methods, how can practitioners decide the method(s) that offer the best options for application? The following guidelines are presented to help practitioners in the selection process.

1. **Determine the strategy of task analysis that is most likely to generate the specific information you need for your education/training program.**

Worker-oriented task analysis is most valuable for identifying the types of activities associated with the job (e.g., judgments, interpersonal relationships), rather than the specifics of what the worker actually does (Burnett and McCracken 1982).

- *The Position Analysis Questionnaire* (PAQ) is the most well-known method of worker-oriented task analysis. It characterizes jobs by human behavior requirements through the use of 187 worker-oriented job elements. The PAQ reveals the types of interpersonal relationships required in task performance, which are often overlooked in task inventory analysis (ibid.).
- The *Occupational Analysis Inventory*, another worker-oriented instrument, groups 622 work elements into 5 categories of job-related behaviors: information received, mental activities, work behavior, work goals, and work context. It identifies the worker characteristics associated with specific jobs—information that can be used as one way to match workers to the jobs (ibid.).

Job-oriented task analysis details not only *what* workers do but *how well* they must do it. It is the most traditional form of task analysis and is extensively used in developing curriculum.

- *Task Inventory Analysis* results in an inventory of tasks performed by job incumbents, which are designated by importance, frequency, and job relevance.
- *DACUM (Develop A CurricuUM)* follows a seven-step process to produce a job profile, which provides a structure for analyzing each specified task—the sequenced steps, performance standards, related knowledge and skills, tools and equipment, worker behaviors and attitudes, safety considerations, decisions involved in task performance, and future occupational trends and concerns (Norton 1996).
- *V-TECS (Vocational-Technical Education Consortium of States)* has developed another task-focused job analysis process that is similar to DACUM. The V-TECS

method also produces task lists, performance objectives, standards for performance, and sequenced task performance steps. In addition, it includes enabling objectives and related academic skills.

Cognitive task analysis emphasizes the cognitive skills workers need to perform tasks that now call for inference, diagnosis, judgment, and decision making—skills in demand by today's organizations that are characterized by flattened hierarchies, work teams, and participatory management (Texas Higher Education Coordinating Board 1995).

- *FIPM* is an approach to cognitive task analysis that analyzes knowledge about jobs in terms of **F**act, **I**mage, **P**rocedure, and **M**echanism (Black et al. 1995). It allows for unique distinctions to be made between jobs in terms of the knowledge required to perform various jobs—including knowledge gained through informal as well as formal processes of information exchange (ibid.).

2. Consider the cost-efficiency of the strategy you select.

Traditional task analysis methods are expensive to conduct, involve processes that are long and tedious, and require the efforts of trained analysts (Bailey and Merritt 1995). The DACUM process of task analysis, however, is more cost efficient than most other methods. Although it requires the active involvement of business-industry representatives, it demands less time, expense, and staff training than the task inventory methods of task analysis (Hesse and Nijhof 1988). The cost and benefits of cognitive task analysis cannot be determined until the process receives more widespread application (Hanser 1995). However, Dehoney (1995) reports that cognitive task analysis requires far more time and complex data analysis than traditional task analysis.

When selecting a task analysis method, it is important to make clear determinations of how much time will be involved, how you will obtain expert workers, how you will verify experts' judgments, what training will be required for staff, and what costs will be associated with each aspect of the process.

3. Be able to ensure that the strategy provides acceptable and reliable information.

Both the worker-oriented and job-oriented task analysis strategies described have proved to be accepted by users as reliable forms of task analysis (Burnett and McCracken 1982). DACUM and V-TECS have special appeal to the skill standards movement and to school-to-work programs such as tech prep in that they require the involvement of business and industry, which adds validity to the effort and establishes linkages between schools and the business community.

Cognitive task analysis has not yet been proven practical in application (Hanser 1995). The data collection, retrieval, and reporting methods used for an analysis, however, have the potential for bias and error (Dehoney 1995).

4. Plan for periodic review and update of any task analysis.

Work is dynamic—tasks change, processes change, technologies change, and the knowledge and skills required for jobs change. To be an effective tool for education and training, the task analysis must reflect what is happening in the real world/workplace. Burnett and McCracken (1982) suggest that the periodic review and update of task analyses should employ different techniques to ensure that all areas of the job have been identified.

5. Consider using a combination of methods to capitalize on the strengths of each.

Hanser (1995) suggests that educators look to create a synergy between traditional job analysis and cognitive task analysis as a means for eliminating the skills gap evident in today's workplace. Black et al. (1995) suggest that cognitive task analysis be used to enhance instructional and technological education by providing a source for site-specific educational materials that are situation based and reflect the current emphasis of cognitive theory that promotes contextual learning. Norton (1996) promotes expanding the focus of job-related task analysis to include a DACUM Enhanced Literacy Task Analysis (DELTA) for identifying the basic skills associated with various tasks. One example of expanded task analysis is the Ohio Competency Analysis Profiles (OCAPs), which were developed through the use of a modified DACUM process. These profiles identify the occupational, academic, and employability skills for given occupational areas and outline three levels of skills—core, advancing, and futuring (Vocational Instructional Materials Laboratory 1996). They may be found in the ERIC database.

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